

BASIS FOR THE AMENDMENT

New Claim 20 has been added as supported, for example, in Figure 3(a) as originally filed.

No new matter is believed to have been added by entry of this amendment. Entry and favorable reconsideration are respectfully requested.

Upon entry of this amendment Claims 1-20 will be active in this application.

INTERVIEW SUMMARY

Applicants wish to thank Examiner Ziska for the helpful and courteous discussion with Applicants' Representatives on October 21, 2010. During this discussion it was noted that U.S. Appl. Pub. No. 2003/0146091 (*Vogel*) discloses locating a vesicle upon the aperture, but does not disclose forming a planar lipid bilayer membrane upon addition of a buffer solution from the upper side of the chamber to the lipid solution. Regarding Claim 9, it was discussed that *Vogel* does not disclose a liquid trap as claimed in part d) of Claim 9.

REMARKS

Applicants respectfully request reconsideration of the application, as amended, in view of the following remarks.

The rejection of Claims 1-19 under 35 U.S.C. § 103(a) as obvious over U.S. Appl. Pub. No. 2003/146,091 to Vogel et al. (*Vogel*) is traversed.

Amended Claim 1 is directed towards a method of forming a planar lipid-bilayer membrane for membrane protein analysis, the method comprising:

(a) filling a microchannel with a buffer solution, the microchannel being disposed under a horizontal partition wall having an aperture;

(b) applying a small amount of a lipid solution as a droplet to the aperture filled with the buffer solution to form a thin layer of the lipid solution in a chamber, the chamber being formed at a position corresponding to the aperture of the partition wall and being provided with a liquid trap on the partition wall inside the chamber; and

(c) applying the buffer solution as a droplet to the chamber *from the upper side* of the chamber, ***thereby forming a planar lipid-bilayer membrane.***

Thus, the planar lipid-bilayer membrane of Claim 1 is formed after adding the buffer solution on top of the thin layer of lipid solution, in part (c) of amended Claim 1. See also the specification at page 14, lines 7-11.

In contrast, *Vogel* discloses adding a buffer solution comprising vesicles upon an adhesion surface with an aperture, and then locating and adhering the vesicle over the aperture. See paragraphs [0212] and [0329], and Fig. 19.

Vogel does **not** disclose or suggest forming a planar lipid-bilayer membrane by adding a buffer solution after adding a lipid solution. Therefore, amended Claim 1, and claims depending therefrom are not obvious over *Vogel*.

Furthermore, **new Claim 20** is directed to the method of claim 1, wherein the lipid solution comprises no microstructure in the form of a liposome or lipid bilayer. *Vogel* neither discloses nor suggests forming a lipid-bilayer membrane from a solution comprising no microstructure. *Vogel* discloses cells, vesicles, organelles and fragments. See paragraph [0010]. Thus, new Claim 20 is additionally patentable over *Vogel*.

Claim 9 is directed to a device for forming a planar lipid-bilayer membrane for membrane protein analysis, the device comprising:

- (a) a substrate;
- (b) a partition wall disposed over the substrate so as to be parallel to the substrate;
- (c) a microchannel defined by the substrate and the partition wall;
- (d) a chamber provided with an aperture formed in the partition wall and ***a liquid trap formed at the periphery of the aperture***; and
- (e) ***a microinjection device*** for applying droplets of a lipid solution and a buffer solution to the chamber from the upper side of the chamber.

Thus, the device of Claim 9 includes a liquid trap in the chamber at the periphery of the aperture. Embodiments of this liquid trap are illustrated in Fig. 4 (15), Fig. 6 (15), Fig. 7 (45), and Fig. 8(f) (not enumerated in this figure). The liquid trap is neither described nor suggested by *Vogel*, as *Vogel* discloses only an adhesion surface without a liquid trap. See Fig. 1-9, 19, and 20.

The Office alleges that the liquid trap performs the same function as the adhesion surface taught in *Vogel*. See pg. 6 of the Office Action of July 23, 2010. However, the adhesion surface 86a of *Vogel*, in conjunction with the spacer 78c, retains a carrier solution

over the aperture (Fig. 3 and paragraphs [0108]-[0110], [0132], [0144], [0265], and [0269]), but does not control the thickness of a lipid solution.

Furthermore, *Vogel* does not teach a microinjection device for applying droplets of a lipid solution and a buffer solution to the chamber from the upper side of the chamber, as in feature (e) in Claim 9, in conjunction with a device having a liquid trap. For this reason as well, Claim 9 and claims depending therefrom are not obvious over *Vogel*.

Amended Claim 11 is directed to the device according to claim 9, wherein the partition wall has a channel connected to the liquid trap for *controlling the thickness* of a layer of the lipid solution. A *channel within a partition wall* (specification, Fig. 6, 12A) is not disclosed or suggested in *Vogel*. In *Vogel*, adding carrier solution “onto” the adhesion surface, i.e. from above, is described (see, *inter alia*, paragraph [0249]). Therefore, Claim 11 is separately patentable over *Vogel*.

Amended Claim 17 is directed to the device according to claim 9, wherein the *aperture* is provided with a taper so that the diameter of the aperture narrows from the lower side toward the upper side. *Vogel* does not disclose or suggest a device wherein the *aperture* is tapered, as claimed in Claim 17. Rather, *Vogel* discloses a device wherein the substrate 158 (optionally including a surrounding insulating layer 166) is tapered, *not the aperture* 164. See Fig. 5. Thus, Claim 17 is separately patentable over *Vogel*.

Therefore, the rejection of Claims 1-19 under 35 U.S.C. §103 (a) as obvious over *Vogel* is believed to be unsustainable as the present invention is not obvious and withdrawal of this rejection is respectfully requested.

In regard to the Office's request to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made, the Applicants have confirmed that all claims were and are commonly owned.

Applicants submit that the present application is now in condition for allowance and early notice of such action is earnestly solicited.

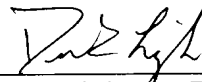
Respectfully submitted,

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